

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
27 November 2003 (27.11.2003)

PCT

(10) International Publication Number
WO 2003/097814 A3

(51) International Patent Classification⁷: A61K 38/00,
C07K 14/00, 16/00

(74) Agents: CAROL, Larcher et al.; Leydig, Voit & Mayer,
LTD, Two Prudential Plaza, suite 4900, 180 North Stetson,
Chicago, IL 60601-6780 (US).

(21) International Application Number:
PCT/US2003/015991

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD,
SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US,
UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 15 May 2003 (15.05.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 60/381,322 16 May 2002 (16.05.2002) US

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): THE
GOVERNMENT OF THE UNITED STATES OF
AMERICA, REPRESENTED BY THE SECRETARY,
DEPT. OF HEALTH AND HUMAN SERVICES
[US/US]; National Institutes of Health, Office of Tech-
nology Transfer, Suite 325, 6011 Executive Boulevard,
Rockville, MD 20852 (US).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): BOYD, Michael
R. [US/US]; 109 Austill Avenue, Mobile, AL 36608
(US). BOKESCH, Heidi R. [US/US]; 6782 Sunny Brook
Drive, Frederick, MD 21702 (US). O'KEEFE, Barry
R. [US/US]; 8110 Glendale Drive, Frederick, MD 21702
(US). McKEE, Tawnya C. [US/US]; 17500 Taunton
Drive, Gaithersbury, MD 20877 (US).

(88) Date of publication of the international search report:
1 July 2004

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: SCYTOVIRINS AND RELATED CONJUGATES, FUSION PROTEINS, NUCLEIC ACIDS, VECTORS, HOST
CELLS, COMPOSITIONS, ANTIBODIES AND METHODS OF USING SCYTOVIRINS

WO 2003/097814 A3

(57) Abstract: An isolated or purified antiviral protein consisting essentially of the amino acid sequence of SEQ ID NO: 1, an amino acid sequence that is about 90% or more identical to SEQ ID NO: 1, an amino acid sequence that is about 90% or more homologous to SEQ ID NO: 1, or an antiviral fragment of any of the foregoing; a variant, fusion protein or conjugate thereof; a composition comprising (i) at least one of the foregoing and (ii) a carrier, excipient or adjuvant; an isolated or purified nucleic acid consisting essentially of a nucleotide sequence encoding the amino acid sequence of the aforementioned antiviral protein or antiviral fragment thereof, or a variant or fusion protein of either of the foregoing; an isolated cell comprising an above-described isolated or purified nucleic acid; a composition comprising (i) an above-described isolated or purified nucleic acid, and (ii) a carrier, excipient or adjuvant; a method of inhibiting a viral infection of a host comprising administering a viral infection-inhibiting amount of at least one of an above-described antiviral protein or an antiviral fragment thereof, a variant or fusion protein of either of the foregoing, an above-described nucleic acid, or an isolated cell comprising an above-described nucleic acid; a method of inhibiting a virus in a biological sample or in/on an inanimate object comprising contacting the biological sample or the inanimate object with a viral-inhibiting amount of at least one of an above-described antiviral protein or an antiviral fragment thereof, or a variant, fusion protein or conjugate of either of the foregoing, antibodies and composition thereof, and a method of inhibiting infection of a mammal with a virus comprising administering to the mammal an anti-scytovirin antibody in an amount sufficient to induce in the mammal an immune response to the virus.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/15991

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 38/00; C07K 14/00, 16/00
 US CL : 514/2, 8; 435/ 69.1; 530/ 350, 387.2; 536/23.7

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : Please See Continuation Sheet

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 WEST, BLAST, PubMed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	BOYD et al. Discovery of Cyanovirin-N, a Novel Human Immunodeficiency Virus-Inactivating Protein that Binds Viral Surface Envelope Glycoprotein gp120: Potential Application to Microbicide Development. Antimicrobial Agents and Chemotherapy. July 1997, Vol. 41, No. 7, pages 1521-30.	1-32, 37-40, 46-48, 51-61
A	YEH et al. Design of Yeast-secreted Albumin Derivatives for Human Therapy: Biological and Antiviral Properties of a Serum Albumin-CD4 Genetic Conjugate. Proceedings of the National Academy of Sciences, USA. March 1992, Vol. 89, pages 1904-1908.	4-7, 19, 20
Y	ZAGHOUBANI et al. Induction of Antibodies to the Envelope Protein of the Human Immunodeficiency Virus by Immunization with Monoclonal Anti-idiotypes. Proceedings of the National Academy of Sciences, USA. July 1991, Vol. 88, pages 5645-5649, entire document.	56-58
Y	FUNG et al. Monoclonal Anti-idiotypic Antibody Mimicking the Principal Neutralization Site in HIV-1 gp120 Induces HIV-1 Neutralizing Antibodies in Rabbits. The Journal of Immunology. Octobre 1990, Vol. 145, No. 7, pages 2199-2206, see entire document.	56-58



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

*T

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

*X

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

*Y

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

*&

document member of the same patent family

Date of the actual completion of the international search

12 April 2004 (12.04.2004)

Date of mailing of the international search report

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Zachariah Lucas

Telephone No. 571-272-1600

19 MAY 2004

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/15991

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claim Nos.: 33-36 and 41
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Please See Continuation Sheet
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☒

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/US03/15991

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, P	US 6,428,790 B1 (BOYD) 06 August 2002 (06.08.2002), entire document.	1-32, 37-40, 46-48, 51-61
Y	US 6,245,737 B1 (BOYD et al.) 12 June 2001 (12.06.2001), entire document.	1-32, 37-40, 46-48, 51-61
A	SCHAEFFER et al. Anti-HIV Activity of Extracts and Compounds from Algae and Cyanobacteria. Ecotoxicology and Environmental Safety. March 2000, Vol. 45, No 3, pages 208-227.	1-32, 37-40, 46-48, 51-61

INTERNATIONAL SEARCH REPORT

PCT/US03/15991

Continuation of Box I Reason 2:

Claims 33-36 read on fusion proteins comprising the variant of a nucleic acid. It is not clear what is being claimed. Therefore the claims are unsearchable.

Claim 41 is unsearchable because there are two claims 41 which are not duplicates one of the other. It is therefore not clear which claim 41 is to be examined.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-15, 37-40, 42-45 (in part), and 46-50, drawn to antiviral proteins, and a first methods of using such.

Group II, claim(s) 16-32, 37-40, and 42-45 (in part), drawn to nucleic acids encoding antiviral proteins, and a first method of using them.

Group III, claim(s) 51-61, drawn to anti-scytovirin antibodies, and to a first method of using such.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: each of these Groups comprises products and methods of using such that have different structures, each of which also has a different mode of operation. The different inventions therefore lack unity.

Continuation of B. FIELDS SEARCHED Item 1:

514/2, 8; 424/ 130.1, 140.1, 150.1, 164.1, 178.1, 184.1; 435/ 69.1, 69.3, 69.7; 530/ 300, 350, 387.1, 387.2, 387.9, 388.3, 388.35, 388.85, 389.1, 402, 403; 536/23.4, 23.7, 23.72